

Amendments to the Claims:

Please CANCEL claims 1-3 and 5-21 without prejudice and ADD new claims 22-54 such that the claims read as follows:

1 to 21. (Canceled)

22. (New): An apparatus for storing wafer carriers, comprising:

a frame positionable on a cleanroom floor adjacent an interface wall separating a processing station from the cleanroom, the frame comprising a floor-mounting portion configured so as to extend along the interface wall at an elevation below that of a docking station located adjacent a docking port formed in the interface wall through which the processing station may receive and discharge substrates with a wafer carrier disposed on the docking station;

a plurality of wafer carrier storage shelves supported by the frame and aligned in a vertical column above the docking station; and

a wafer carrier mover adapted to carry a wafer carrier between a shelf of the plurality of wafer carrier storage shelves and the docking station, the wafer carrier mover including a support member adapted to be moved parallel to the interface wall, adjacent the plurality of wafer carrier storage shelves, and an end effector movably connected to the support member and configured to engage the wafer carrier, the wafer carrier mover being supported by the frame.

23. (New): The apparatus of claim 22, wherein the floor-mounting portion of the frame is further configured so as to substantially fit below the docking station.

24. (New): The apparatus of claim 22, wherein the frame further comprises at least one vertically-extending post extending upward from the floor-mounting portion so as to support the plurality of wafer carrier storage shelves.

25. (New): The apparatus of claim 22, wherein the frame has a rectangular aspect.

26. (New): The apparatus of claim 25, wherein the frame has a rectangular aspect as viewed from above the frame.

27. (New): The apparatus of claim 25, wherein the frame has a rectangular aspect as viewed from in front of the frame, looking toward the interface wall.

28. (New): The apparatus of claim 22, wherein the frame is limited in length so as to fit in front of the processing station without extending in front of adjacent processing stations.

29. (New): The apparatus of claim 22, wherein the floor-mounting portion of the frame comprises a horizontally-extending frame member configured to extend outward away from the interface wall so as to define a depth of the frame.

30. (New): The apparatus of claim 29, wherein the frame is configured so as to contain the plurality of wafer carrier storage shelves within the depth of the frame.

31. (New): The apparatus of claim 29, wherein the frame is configured so as to contain the end effector of the wafer carrier mover within the depth of the frame.

32. (New): The apparatus of claim 29, wherein the frame is configured so as to contain wafer carriers stored on the plurality of wafer carrier storage shelves within the depth of the frame.

33. (New): The apparatus of claim 29, wherein the horizontally-extending frame member extends outward away from and perpendicular to the interface wall.

34. (New): The apparatus of claim 22, wherein the floor-mounting portion extends parallel to the interface wall.

35. (New): The apparatus of claim 22, wherein each of the plurality of wafer carrier storage shelves are positioned adjacent the interface wall.

36. (New): The apparatus of claim 22, wherein the vertical column of wafer carrier storage shelves is positioned adjacent a vertical channel so as to permit movement of wafer carriers along the vertical column.

37. (New): The apparatus of claim 36, wherein the wafer carrier mover is adapted to transport a wafer carrier to a selected storage shelf by moving the wafer carrier vertically through the vertical channel to position the wafer carrier adjacent the selected storage shelf and at an elevation above an elevation of the selected storage shelf, and horizontally to position the wafer carrier over the selected storage shelf.

38. (New): The apparatus of claim 22, further comprising an interstation wafer carrier mover to transport a wafer carrier between one of the first plurality of shelves and a wafer carrier storage shelf of another wafer carrier storage apparatus.

39. (New): The apparatus of claim 38, wherein the interstation wafer carrier mover includes a support member movable in a path parallel to the interface wall and an end effector adapted to engage the wafer carrier, the end effector being vertically movable relative to the support member of the interstation wafer carrier mover.

40. (New): The apparatus of claim 38, wherein the interstation wafer carrier mover further comprises a rotary mechanism adapted to move the wafer carrier through a curved path.

41. (New): The apparatus of claim 40, wherein the rotary mechanism is adapted to move the wafer carrier through a curved path so as to permit the wafer carrier to be exchanged between the processing station and another processing station disposed on another side of a corner of the cleanroom.

42. (New): The apparatus of claim 40, wherein the rotary mechanism is adapted to move the wafer carrier through a curved path so as to permit the wafer carrier to be exchanged between the processing station and another

processing station disposed along another wall of the cleanroom opposite the interface wall.

43. (New): In a semiconductor device processing system, a method for installing an apparatus for storing wafer carriers adjacent a processing tool, the method comprising:

providing an apparatus for storing wafer carriers comprising:

i) a frame adapted for floor-mounting and positionable adjacent a cleanroom wall, the frame comprising an extended portion configured so as to extend along the cleanroom wall at an elevation below that of a docking station of a processing tool;

ii) a plurality of wafer carrier storage shelves supported by the frame and adapted to store wafer carriers, the plurality of shelves being aligned in a vertical column; and

iii) a wafer carrier mover supported by the frame and adapted to move wafer carriers along a path within a first plane containing the vertical column of shelves and a docking station of a processing tool;

positioning the extended portion of the frame adjacent an interface wall separating a processing tool from a cleanroom and at an elevation below an elevation of a docking station of the processing tool; and

positioning the frame such that the vertical column of shelves is aligned above the docking station of the processing tool.

44. (New): The method of claim 43, wherein the step of providing an apparatus for storing wafer carriers comprising a frame adapted for floor-mounting and positionable adjacent a cleanroom wall, the frame comprising an extended portion configured so as to extend along the cleanroom wall at an elevation below that of a docking station of a processing tool comprises:

providing a floor-mountable portion of the frame that comprises the extended portion of the frame.

45. (New): The method of claim 44, further comprising placing the floor-mountable portion of the frame on a floor of the cleanroom.

46. (New): The method of claim 45, further comprising bolting the floor-mountable portion of the frame to the floor of the cleanroom.

47. (New): The method of claim 43, further comprising securing the frame to the interface wall.

48. (New): In a semiconductor device processing system, a method for transporting wafer carriers between a wafer carrier storage shelf of an apparatus for storing wafer carriers and a docking station of a processing tool, the method comprising:

providing an apparatus for storing wafer carriers comprising:

i) a frame adapted for floor-mounting and positionable adjacent a cleanroom wall, the frame comprising an extended portion configured so as to extend along the

cleanroom wall at an elevation below that of a docking station of a processing tool;

ii) a plurality of wafer carrier storage shelves supported by the frame and adapted to store wafer carriers, the plurality of shelves being aligned in a vertical column;

iii) a vertical channel adjacent the vertical column of shelves adapted to permit movement of wafer carriers therealong; and

iv) a wafer carrier mover supported by the frame and adapted to move wafer carriers within a first plane containing the vertical column of shelves and the vertical channel;

positioning the frame adjacent an interface wall between a substrate processing tool and a cleanroom such that a docking station of the processing tool is positioned within the first plane and the extended portion of the frame extends along the interface wall at an elevation below that of the docking station; and

causing the wafer carrier mover to move a wafer carrier between a shelf of the vertical column of shelves and the docking station within the first plane via the vertical channel.

49. (New): The method of claim 48, wherein positioning the frame adjacent an interface wall between a substrate processing tool and a cleanroom such that a docking station of the processing tool is positioned within the first plane comprises:

positioning the frame such that the vertical column of shelves is aligned above the docking station of the processing tool.

50. (New): The method of claim 48, wherein causing the wafer carrier mover to move a wafer carrier between a shelf of the vertical column of shelves and the docking station within the first plane via the vertical channel comprises:

causing the wafer carrier to move the wafer carrier horizontally away from the docking station to position the wafer carrier within the vertical channel, vertically through the vertical channel to position the wafer carrier adjacent the selected storage shelf and at an elevation above an elevation of the selected storage shelf, and horizontally to position the wafer carrier over the selected storage shelf.

51. (New): An apparatus for storing wafer carriers, comprising:

a floor-mounted frame positionable on a cleanroom floor adjacent an interface wall separating a processing station from the cleanroom, the frame comprising a floor-mounting portion configured so as to extend along the interface wall at an elevation below that of a docking station located adjacent a docking port through which the processing station may receive and discharge substrates from or to a wafer carrier disposed on the docking station, the frame being adapted to support wafer carriers within a vertically-oriented first plane within the cleanroom and adjacent the docking station;

a plurality of wafer carrier storage shelves supported by the frame and aligned in a vertical column above the docking station for storing wafer carriers within the first plane; and

a wafer carrier mover comprising an end effector adapted to engage a wafer carrier disposed within the first

plane, the end effector being further adapted to carry the wafer carrier along a path contained within the first plane between a shelf of the plurality of wafer carrier storage shelves and the docking station, the wafer carrier mover being supported by the floor-mounted frame.

52. (New): An apparatus for storing wafer carriers, comprising:

a frame adapted for floor-mounting and positionable on a cleanroom floor adjacent an interface wall separating a processing station from the cleanroom, the frame comprising a floor-mounting portion configured so as to extend along the interface wall at an elevation below that of a docking station, the frame further comprising a portion extending upward from the floor mounting portion and adapted to support a plurality of wafer carrier storage shelves within a vertically-oriented first plane within the cleanroom above the docking station;

a plurality of wafer carrier storage shelves supported by the frame comprising a first vertical column of shelves and a second vertical column of shelves for storing wafer carriers within the first plane, and a vertical channel between the vertical columns so as to permit movement of wafer carriers therealong; and

a wafer carrier mover comprising an end effector adapted to engage a wafer carrier disposed within the first plane, the end effector being further adapted to carry the wafer carrier along the vertical channel between the vertical columns, the wafer carrier mover being supported by the frame.

53. (New): A semiconductor device processing system, comprising:

a processing station to perform a fabrication step on a substrate;

a docking port through which the processing station is adapted to receive and discharge the substrate from or to a wafer carrier;

a docking platform adapted to support the wafer carrier adjacent the docking port;

a substrate transfer robot to transfer the substrate through the docking port; and

a wafer carrier storage apparatus located in the cleanroom, the wafer carrier storage apparatus including:

i) a frame adapted for floor mounting and positionable on a floor adjacent the processing station, the frame comprising a floor-mounting portion configured so as to extend laterally at an elevation below that of the docking platform;

ii) a plurality of wafer carrier storage shelves supported by the frame and aligned in a vertical column; and

iii) a wafer carrier mover adapted to carry a wafer carrier within a planar path between a shelf of the plurality of wafer carrier storage shelves and the docking platform, the wafer carrier mover being supported by the floor-mounted frame.

54. (New): The semiconductor device processing system of claim 53, further comprising a mechanism adapted to open a door of a wafer carrier disposed on and supported by the docking platform to provide horizontal access to a substrate stored within the wafer carrier.